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TROPICAL HOUSING & PLANNING

MONTHLY BULLETIN

for Dr. C. A. DOXIADES*

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* This report has been compiled for private circulation only by Prof. J. Tyrwhitt, 77 Trowbridge Street, Cambridge, Mass., USA.

I. CURRENT LITERATURE

HOT DRY AREAS

1. Backhouse, Wm. O. A goldfield's new town. (In News sheet of the International Federation Housing and Town Planning, Nov. 1955, no. 38, p. 31-34; with photos., plans.)

Population: (Welkom): Estimated ultimate population 50,000 Europeans plus 50,000 non-Europeans.
Climate: (Johannesburg) 90°-23° F.
Rainfall: " 33"

This is a reprint of an article which appeared in the May 1955 issue of Town and Country Planning. It is a description of the new town of Welkom, in the Orange Free State, fifty miles from nearest town. It was begun in 1946. Nearest town seems to be Odendaalsrust.

After detailed description of the plan of the whole town there follows a section on "House Types and Density," which follows in its entirety:

House Types and Density

In South Africa every European house has its native servants' quarters and its garage, thus requiring a large site. The minimum site permitted in Welkom is one-fifth of an acre with a street frontage of 70 feet. The maximum gross density is two and a half houses ar acre. Sites for flats are at least two acres each and the maximum density permitted is eighty persons an acre. The minimum floor area of the houses (excluding out-buildings) is 1,500 square feet. The present cost of construction is £2,200, and they are let to the employees of the mining groups at an inclusive rental of £ 5 per month.

Thabong, the native township, neans "place of joy" and is designed to give a pleasant full town life to the town's natives and their families. Like the European township it is designed on the park wedge system. The single family house plots are 40 by 70 feet each and have a density of eight houses per acre; the rental is £ 2 10s. per month.

A large sports area is provided to include playing fields, open-air theatres, children's playgrounds, and all recreational facilities. Also the open space wedges provide desirable amenities for children and adults. The schools are located in these wedges.

Thabong is a complete township with its own shopping centre, community centres, administration buildings, hospital, etc. With the adaptation of the native to urban life a large measure of control will be given to him in the administration of his township and all the shops will be native controlled.

2. Iraq. Development Board. Annual report for the financial year 1953-1954. Baghdad, The Board, 1955. 83p. tables.

Population: (Baghdad) 285,000
Climate: " 123° - 19°F
Rainfall: " 7"

This Board since its establishment in 1950 has engaged 18 experts and engineers from Britain, Belgium, Holland and Switzerland, plus 4 American experts, and has delegated 62 students to engineering colleges for specialized study. Their number will be doubled during the next year.

The report is of a general nature covering progress in irrigation and drainage, highways, public services, etc.

Concerning housing the report states that the Board has allocated I.D. 500,000 (an Iraq Dinar = 1 British £, currently $2.81 in U. S. money) for the construction of simple modern houses for the Sarifa-dwellers on the outskirts of Baghdad and Basra. Blueprints have been made for the construction of 1000 houses with two primary schools at Baghdad, as well as shopping centers and other necessary installations. Miri land near Tel-Muhammed has been selected for the site and the Director-General of Irrigation has been requested to protect the land against possible floods.

Contract for the construction of 1000 houses with rolled steel joist ceilings was awarded at I.D. 304,000; for two primary schools of six classes for I.D. 13,250.

The Board agreed to allocate I.D. 100,000 out of the above-mentioned I.D. 500,000 to the Ministry of Social Affairs for the construction of a group of houses for the settlement of Sarifa-dwellers at Basra. Bids for the first group of 250 houses have been received.

The Board has awarded contract for construction of 410 laborers' houses at Tel Muhammed at I.D. 183,573/-110 and 20 houses at Shaikh Omar at I.D. 11,038/925.

The Board has also authorized (presumably in excess of the I.D. 500,000 previously mentioned) the expenditure of I.D. 300,000 for the construction of houses for laborers and junior officials and to distribute this amount to several provinces.

The following programme covering the reclamation of land projects is quoted in full.

(A) The UNESCO project for fundamental training at Dujaila:

The object of this project is to train young Iraqi men and girls to take charge of the administrative posts of agriculture, health and education and to take care of the settlers of the Dujaila Miri Sirf lands.

(B) Agriculture extension and model farms for the Miri Sirf lands:

In every Miri Sirf lands project a plot has been alloted for agriculture extension and model farm. Such farms render instructions concerning proper methods of irrigation, drainage, preparation of lands for seedings and the use of the best quality of seeds for crops, other agriculture products and garden fruit products. In this way it will possible to distribute improved seeds over the settlers. In this connection a certain amount of progress has been made.

(C) Loans to the Settlers of the Miri Sirf lands:

Settlers granted lands on Miri Sirf land projects need in most cases money for the management of their relative units and such being the case they borrow money for building or purchasing their own houses, animals and foods until they sell their crops. In most cases settlers agree to pay such a high rate of interests for obtaining the loans they need that they fail to pay their debts. The programme covering payment of loans to the settlers of Miri Sirf lands at reasonable rates of interests is being applied and payment of such loans for the first time has been made to the settlers of the Hawija.

(D) Area of the unit of land:

Certain difficulties have arisen in connection with the area of the unit of land to be alloted to settlers and the matter of making water available and the sinking of wells in such units of the project of Miri Sirf lands but such difficulties have been investigated and reported to the Board. The programme of the well diggings is progressing satisfactority.

(E) Sugar production in Iraq.

Experimental works for producing beet sugar which will lead to the establishment of such industry are progressing and eventually a plant for sugar production will be set up at Mosul area.

(F) Appearance of salt on the lands.

The appearance of salt in the Miri Sirf lands of the Dujaila project forms in important problem and there are indications that further such difficulties may arise in the vast area of the southern half of Iraq. Experiments are being carried out at the Dujaila in connection with soil improvement and the prevention of the appearance of the salt. Such experiments are considered of importance and the use of the services of the experts of soils, drainage and Irrigation Engineers is being made in this connection.

(G) Marketting the crops:

Many of the Miri Sirf land settlers offer their crops for sale through the merchants for whom they have received advances. A programme is now under consideration whereby agriculture products of the Miri Sirf lands shall be sold at highest possible prices through a representative of the

settlers and it is expected that by the adoption of this new method better values shall be preserved for the crops and that settlers shall get rid of debts.

Population: (Jerusalem) 150,000

Temperature: " 108°-25°F

Rainfall: " 25"

3. Rose, David. Housing in Israel. (In Technion yearbook, 1956, vol. 13, p. 62-65, 149; with photos.)

"The housing problem in Israel as in most of the world is largely an economic one. Houses built at current costs cannot compete with those built earlier at lower costs. In Israel this has resulted in the development of a recognized institution, called "Key money." The occupant of a rent-fixed dwelling transfers his apartment to a succeeding tenant for a consideration, in which the owner of the house generally shares to the extent of one third of the money paid. With rentals fixed at 1939 rates, the demand for houses at these rates has resulted in passage of rent laws which, with some modifications, have carried over to new construction as well. The result is that there is almost no new rental housing being built.

In the middle of 1950 practically all habitable housing was occupied, and 100,000 immigrants were housed in 53 immigrant camps.

In 1950 the break-up of these camps began and the Maabarot were established. The Maabara differs completely from the camp in that, whereas the camp was a temporary place of transit, the Maabara is a self-supporting village located where it is expected to remain permanently...

The Ministry of Labor has been given the responsibility for housing. The planning of the houses and the land around them is done by the Ministry, and the houses, together with the roads and utilities, are built by building contractors under the supervision of the government.

Every dwelling has its own kitchen, bathroom, one or two rooms and dining space, the size of the apartment depending upon the size of the family and varying in area from 400 square feet to 800 square feet.

Depending on the location, these dwellings are in single and semi-detached houses and in multiple-story apartment buildings of one to four stories. These dwellings (house or apartment) are rented or sold to the immigrant with a small down payment.

A plan was recently inaugurated with the aid of the Palestine Economic Corporation, which has the potential of making the Maabara a most desirable community.

Under this plan, a private donor or investor initiates a project, together with the government, contributing or investing the equity necessary. A village of 200 to 300 families is built adjacent to an existing Maabara. Every family receives a house and a dunam (1/4 acre) of land. The land is irrigated to make possible auxiliary

truck farming. The family not only raises vegetables for its own use but in many cases also has some for sale; it is provided with some chickens and in some cases keeps a goat for milk.

The immigrant buys this for about $2,000, pays down about $250, and receives a mortgage for about 20 years on which he pays about $12 a month for interest and amortization.

Near the cities there are built apartment buildings of two, three or four stories in which the apartments are sold to the immigrant on substantially the same terms as above. The village includes a school, a synagogue, a shopping center and a kindergarten. Thus, the present dweller in the Maabara is transformed from an object of charity to the very finest type of home-owning, self-respecting citizen.

As the money is received in repayment it will be reinvested in a revolving fund for the purpose of continuing the building of similar villages.

The government also participated by furnishing mortgages in other "popular" housing plans in which the buyers are private individuals, members of various unions, agricultural cooperatives and other organizations. All the companies participating in government-assisted housing schemes are organs of public bodies.

Where the immigrant, in very rare cases, cannot raise the money necessary for a down payment, arrangements are made whereby he receives a loan or is given a rental purchase agreement.

Privately built apartments, for the well-established or more prosperous residents, are cooperatively owned, are much higher priced, and are financed on an all cash basis or with short term loans. These are generally in four story buildings and are comparable with American or European standards...*of the house and tilting it up into vertical position thus saving labor and lumber for forms and bracing until the concrete is set. This, also, was disappointing in Israel because of the need for reinforcing steel, which requires foreign currency--the rarest of all commodities in Israel.

Another method tried was the casting of concrete houses with no-fines concrete. This method, while saving materials in the body of the walls, and giving better insulation, required heavier and better plastering on the exterior to keep out moisture, thus offsetting the savings made.

Stabilized or rammed earth as a building material was also tried. Many experiments were made and some houses erected in various parts of the country. The Technical Assistance Administration of the United Nations has sent to Israel a group of experts in that field and work is still going on. Some of the results are quite promising. ...

By far the greatest number of houses were built and are being built, as in our own Florida, for example, of concrete block, plastered on the outside and inside, with roofs of cement tile and floor or terrazzo tile. Multiple-story apartments are built of concrete frame with walls of silicate brick and plastered on the outside and inside. The steel reinforcing is twisted, a method tried in the United States and practically abandoned because of the labor involved. But this method is very practical and economical for Israel, because, though there is more labor, it saves in imported material.

If there is one thing above all that characterized the country's approach to its housing problems, this is its dynamism. There was and is nothing of the inertia which is evident in so many places.

From the beginning of 1949 will the middle of 1955 the government of Israel, through its various departments, has constructed 49,171 semi-permanent housing units and 136,991 permanent dwelling units. Figuring four persons to a family, this constitutes housing accommodations for about 750,000 people, an amount equal to more than the total population in 1949. Truly a monumental task has been accomplished.

Israel is becoming increasingly self-sufficient in materials needed for its building. Cement, the backbone of the building industry, particularly in Israel where very little lumber is used, is now produced in quantity sufficient not only for all local needs but also for export in respectable quantities; lime, too, is plentiful, and local development of lime blocks produces a very fine product for interior walls which equals the gypsum blocks used in the United States.

A hard board and an insulating board made from local eucalyptus logs which exceed the specifications of American standards basic in the building industry, is produced in the Jordan Valley and is now exported to the United States. Steel pipes and large sizes of concrete pipes are now manufactured locally; ceramic ware sufficient for local needs is also produced.

A competition for an "economic roof," sponsored by the government, Technion and the Association of Architects and Engineers, resulted in a prize-winning method which uses pre-cast concrete trusses and reduces the need for imported lumber by more than 70 per cent.

In almost every item of construction, progress in production and in method is continuous. There is still much to be done before the ideal condition, or even a good condition, will be reached, but the crisis in Israel housing has passed its peak."

Another experiment ... consisted of a method of building by the Tilt-up method, which is gaining considerably in the U.S. This method primarily consists of casting the wall with doors and windows built in, on the floor (continue on p.6).

I. CURRENT LITERATURE

HOT HUMID AREAS

4. Boninger, James. New ways of living for the Kamba tribesmen. (In Community development bulletin, Mar. 1956, vol. 7:2, p. 28-30; with photo.)

The author is Provincial Information Officer, Southern Province, Kenya. "Community Development Bulletin" is published by the Community Development Clearing House, University of London Institute of Education.

This brief article describes the work of Community Development teams working amongst African farmers. The team works collectively on one homestead and practical advice is given. The farmer is taught the advantage of hygiene, e.g. need of windows in his house.

Self-help is used extensively in housing. During past six months 177 houses were plastered, 310 windows installed, 260 cattle sheds built, 347 compost pits and 240 latrines dug.

Illustration of Kamba homestead herewith.

A Kamba homestead which has been replanned and improved with the help and advice from the local Community Development Team.

5. Cadavid L., Jorge, and Enrique Barrera R. Vivienda economica. (In Universidad pontificia Bolivariana publicacion bimestral, May-Sept. 1955, vol. 20:74, p. 393-431; with tables.)

Article chiefly concerns Bogota.

Population: (Bogota) over 1,000,000 in 1956

Temperature: " average about 53°F.

Rainfall: " 40"

This article appears under the general heading "Estado Actual de la Arquitectura."

Statistics established by the Pan American Union give the population of Latin America as 155,350,000, and at the figure of 5.5 persons per family, this would indicate 28,246,188 families. There are in habitable condition only 16,524,020 dwelling units, leaving a persent need of 11,722,168 dwellings. Figures based on a 50-year span indicate need of 234,443 new units per year.

For Colombia for the period 1950-1955 the estimate of new housing need is given as 107,350 urban, 244,500 rural, making a total of 351,850. A comparison of housing densities from 1938 to 1951 shows that Bogota's housing density of 9 persons per house continues at that figure; Medellin's at 7; Barranquilla's density during this period diminished from 9 to 8 and Cali's from 8 to 7; Cucuta's increased from 6 to 7, and Pasto's from 9 to 10.

It is estimated that the average workingmen's income is about $84.00 per month and that he is not able to pay more than $20.00 per month for housing. This is figured on the basis of a $5,000.000 house financed over 20 years with a down payment of $250, and a monthly payment with interest totaling $19.79.

There follows a section devoted especially to the city of Medellin. Climatic data is given as follows:

Longitude 1°28'59" W of meridian of Bogota
Latitude 6°15'06"
Altitude above sea level: 1,540 meters
Temperature: average 71°F.

The area is approximately 427 square kilometers. The density of development is 836 persons per square kilometer.

The report then quotes from a 1951 report of the International Bank for Reconstruction and Development concerning the types of building materials generally in use:

a) brick or concrete with tile roof.

b) adobe with tile roof.

c) mud with cane or bamboo, with tile or metal roof. This type is used by the lower rental groups both urban and rural.

d) walls of bamboo, bamboo cane or similar material covered with palm leaves and with straw roof.

e) the floors of the houses occupied by the low-rent groups, especially in the rural areas, are of trodden earth and occasionally of brick. In the houses of a higher economic class we encounter floors of concrete or tile.

It appears that the climate exerts very little influence on the architecture of materials of construction. These depend exclusively on the rent.

6. Kenya's forest village centres. (In Community development bulletin, Mar. 1956, vol. 7:2, p. 45-46.)

Brief note follows in its entirety.

Climate: " 90° - 36°F

Rainfall: " 39"

KENYA'S FOREST VILLAGE CENTRES

"Early in 1953 orders were given for the further concentration of forest employees' huts into compact villages. Whilst in some areas concentration had to be effected into hastily improvised villages on sites selected for security reasons only, on others there has since been time to plan the rebuilding of some of the villages as long-term projects. The opportunity is being taken to effect an improvement in the standard of the huts, the main changes being in the height and construction of the walls, the provision of good doors and shutters with frames, and better roof construction and thatching. Coupled with the improvement in the villages and the development of Welfare Centres to serve them, measures are being taken to improve the standards of cleanliness and hygiene and to foster the ideas of mutual help and inter-dependence in the village communities. African Village Managers, the majority of whom have been sent to Jeanes School, Kabete, for a course of training, are now in charge of all the principal villages. In a few cases they are assisted by women welfare workers who have also been trained in child welfare and handicrafts. The general response from the forest employees has been encouraging. Support for the schemes is being given willingly by a large section, more particularly by the women, who have proved receptive to new ideas and eager to profit by the instruction given them."

7. Massal, Emile. Village hygiene--Part II. (In Community development bulletin, Mar. 1956, vol. 7:2, p. 39-42; with photo.)

Climate (Apia, Samoan Islands) 29°-96°

Rainfall: 118"

The author is Executive Officer for Health to the South Pacific Commission.

The section on "Housing" follows in its entirety.

"The home of the South Pacific islander is, as everywhere else indeed, particularly suited to local conditions, materials available, climate, social habits, etc. This does not mean that the dwellings always fulfil the rules of hygiene; far from it. Ventilation and lighting are too often inadequate, the floors of rammed earth are often polluted and damp, and in places there is excessive overcrowding. There is much room for improvement. Advice and attempt have not been lacking, but they have not always been very successful, since emphasis has often been placed on introducing foreign types of dwellings rather than in making a serious attempt to improve the native hut.

In the Austral Islands Group, at Mangareva, and in the Cook Islands, I have come across huge constructions with thick stone walls, pierced with narrow windows, the floor paved with stones and the roof made of plaited coconut or pandanus leaves, which resemble a fortress rather than a tropical dwelling. It should be added that the islanders leave them willingly to go back to their ancestral huts.

Furthermore, in New Caledonia for instance, the natives have been encouraged to build rectangular daub dwellings, with European doors and windows (a wooden panel often replaces the panes), with a narrow veranda on the long sides, a floor of rammed earth and a roof of plaited leaves, niaouli bark or corrugated iron. Elsewhere one finds wooden houses, a simple cubic construction sometimes made more attractive by the addition of a veranda, with a corrugated iron roof.

None of these new types represents real progress. The islander was in the habit of renovating his hut periodically as soon as the shelter afforded was considered inadequate. On the other hand, once he has built a European type house, he considers it should last indefinitely without any maintenance. The result is too well known for us to dwell on it longer.

Moreover, the native hut is capable of improvement; sufficient proof of this is given by the fine achievements of a number of Europeans who have adopted the Tahitian hut, fitted it with every comfort one could wish for, and consider it far more comfortable than any other type of

habitation. Without going so far as to recommend that islanders should imitate there often very expensive adaptations, I consider that in many villages the solution lies in improving the native hut, kitchen and bathroom.

A survey of the question is essential; it should deal with drawing up plans for types of houses which might be easily enlarged, the better utilisation and preservation of local materials, the adaptation of simple sanitation installations and rational equipment of kitchens, and the average duration of these dwellings, a minimum of maintenance being taken into account.

Certain villages in Samoa, Fiji, and the Trobriands for instance, with their dwellings arranged neatly around a central clearing, give a pleasantly harmonious impression. Elsewhere, the way in which houses are scattered haphazardly makes the villages less attractive. Sometimes also the site is unsuitable, or the surrounding district unhealthy. A number of reasons which do not escape my notice made necessary or justify measures which, at first sight, seem to be determined by chance.

Improvements are often possible. I call to mind the former village of Tatakoto in the Tuamotus, built on damp ground at the edge of the inland lagoon in a hot and airless spot. The villagers complained that they were pestered by large numbers of mosquitoes and blamed the poor situation of the village for encouraging tuberculosis which took its toll mainly of the infant population (serious primary infections of lymphatic type).

With the help of a Catholic missionary they decided to move their village. A new site was chosen, facing the open sea, well ventilated and on the dry soil of the atoll. Roads were marked out at right angles in the coconut groves allowing space around each dwelling. Dwellings were built on a raised platform, from coral and lime blocks, with fairly thin walls and large openings; the roofs were in corrugated iron so as to collect rain water in individual tanks. The whole effect is neat, attractive and clean; occasional painting over with whitewash and painting the iron roofs ensures maintenance.

This achievement, carried out by a system of mutual aid and partially financed by the local co-operative society, was repeated in other islands of the group. It shows how the wishes of the population can be met with a minimum of guidance and means."

The article continues with sections on need of disease prevention through insecticides, etc., and on the need of personal cleanliness, and food hygiene.

8. Natal, South Africa. Town and Regional Planning Commission. Annual report for the year 1st April, 1954 to 31st March, 1955. (Second report.) [Durban?, The Commission, 1955.] 38p. map, tables.

Population: (Durban) 430,256
Temperature: " 111° - 41° F
Rainfall: " 45"

This is a very general coverage of the activities of the Commission. The section on housing is a description of the method of procedure in the survey of "flats," in Durban. This description of procedure is followed by "General Observations Resulting from the Survey," They are given with "The thought that they may be of some value to the Commission and its officers in relation to the development of future policy regarding the control of the design of flats."

Extracts follow:

"(1) Of all persons interviewed, roughly half stated that they were obliged to live in flats by necessity, rather than by choice.

These appeared to be four principal reasons why people live in flats. These are:

(a) Shortage of houses
(b) Economic advantage
(c) Security
(d) Convenience

These four considerations are applicable in all cases; occasionally only one reason may be given but more often two or three or even all four factors may apply.

...

(3) The shortage of houses refers not merely to an overall insufficiency of accommodation in houses, but is bound up with both economic and geographical factors. Thus there may be a particular shortage of houses in a given price class or a lack of houses available in a convenient situation which does not involve the family in excessive transport costs or in undue loss of time in the daily journeys to tork and to school.

...

(7) The economic factor undoubtedly plays a large part in forming the attitude of the individual towards living in flats. Even those who expressed a strong desire to get away from flat life and to secure a house for themselves realised that living in a flat was cheaper than living in a house. This incentive is of particular importance to young people who are starting their own homes, and to elderly retired people, since the cost of furnishing and running a flat is demonstrably less than in the case of even a modest house and the flat, moreover, presents as a rule less difficulties with domestic servants and less expense in their employment.

...

(9) Security was a reason which was given mainly by elderly people, women living on their own and wives whose husbands were often away from home, and who were nervous of occupying a house alone.

(10) Convenience is a very important factor in influencing people to live in flats. In the first place convenience of locality in relation to the problems of travelling to work and schools, and convenience to local facilities such as a local neighbourhood centre with schools, shops, offices, cinema, bank and post office, are matters of considerable practical importance to many people, especially those who are dependent on public transport, and secondly, the greater convenience in running a flat which it would appear, from the comments of many people who were living in flats after previously living in a house, has so many advantages as to outweigh many of the admitted disadvantages of flat life.

...

III. SPECIAL ARTICLES

9. Singapore Improvement Trust. Master plan reports. Singapore, Government Printing Office, 1954-1955. 3 vols. - folder maps. photos., plans, charts, tables.

Population: 1,167,682

Climate: 87° - 74° F (U.S. Dept. of Agriculture data)*

Rainfall: 95"

These reports were prepared in accordance with a Singapore Improvement Ordinance requiring a diagnostic survey of the Colony to be carried out and within three years from Jan. 1952 (later extended to Dec. 1955), a report of the survey to be submitted together with a Master Plan indicating the manner in which it is proposed that land in the Colony should be used. The responsibility for the Survey and Plan rests on the Board of the Singapore Improvement Trust. To carry out the Survey and prepare the Plan, a Diagnostic Survey Team was appointed and has worked since Jan. 1952 under the general direction of Sir George L. Pepler, C.B., Town Planning Adviser to the Colony, and the Manager of the Singapore Improvement Trust.

The three volumes are entitled as follows: Master Plan: Report of Survey; Master Plan: Written Statement; Master Plan: Reports of Study Groups and Working Parties. The whole series is generally more concerned with the broader aspects of planning than with housing per se, though of course much of material is basic to housing. Comparison of these reports with the "Work of the Singapore Improvement Trust, 1954," compiled by J. M. Frazer, might be of interest. (The latter was digested in these Bulletins, Dec. 31, 1955, no. 3, item 6.)

In general, for purposes of study the planning areas have been divided into planning districts as follows: a) Central planning area; b) Urban planning area; c) Rural planning area.

Vol I

Master Plan: Report of Survey. This volume gives much physical data, such as the following: Singapore Island has an area of 224.5 sq. miles. It is comparatively low-lying, and summits of its hills generally do not exceed 500 ft. in height. Mangrove swamps obscure much of coast, especially on west and extend inland along tidal estuaries. The City occupies S.E. quadrant of Island and has deep water facilities for ships. Subsoil conditions vary considerably so study necessary in the choice of suitable building land. The slightly less than 100 inches a year of rainfall is well distributed throughout the year with a maximum occuring either in December or January. Most of the rainfall comes in very heavy storms causing an extremely rapid runoff, therefore adequate drainage is required. Humidity is high. Local air movements are of greater importance than prevailing winds and are variable from place to place in direction and intensity. Sunshine is intense and even cloudy skies are bright. In spite of rainfall Singapore is short of fresh water, due to high evaporation rate and to runoff. One twentieth of Island now has been developed for supply of water by creation of three impounding reservoirs. On East side of Island the work of sinking wells is in hand to supply water.

In 130 years Singapore has grown from 2000 to 1 1/4 million population (Atlas figure gives over 1 1/2 million!). Chinese now 78% of total population, and Indians 8%. Migration has slowed down greatly since the War. The report states: "On the basis of present trends and likely future developments, it seems probable that the upper limit which the Island can support by 1972 without a lowering of the present standard of living may lie between 1.6 million and 1.8 million people, and the Island may by then have a surplus population problem building up to a figure of about a quarter of a million."

Chapter 7 of this volume is entitled, "Housing" and is reproduced herewith.

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* This Singapore volume gives 93° - 70° F.

145. The pressure of increasing population is felt most acutely in housing and that pressure is further increased by the needs of the many people poorly housed at present. Need for new homes arises from three main sources, as follows:--

(a) a large number of existing residential buildings are so dilapidated that they must be replaced;
(b) there is considerable overcrowding in buildings which are structurally sound;
(c) the population is increasing rapidly.

146. The preparation of a housing policy is the function of the housing authority; the function of the Master Plan is to co-ordinate such a policy with the policies of other users of land to secure good siting, efficient communications, adequate services and a beneficial environment. The Team has based its conclusions on the advice of the Study Groups and Working Parties concerned and on consultations, mainly with officers of the Singapore Improvement Trust but also with other housing interests. From this advice and consultation, the Team has proceeded to assess total requirements.

Types of Housing

147. The traditional Malay dwelling is the timber-walled, attap-roofed hut. Large numbers of these homes exist in the Colony and, if well-built in a proper environment, the attap hut provides a satisfactory home suited to the climate.

148. After the foundation of the present settlement in 1819, permanent buildings evolved in two main types, namely, the bungalow, a single or double-storey residence generally standing in its own grounds, and the shophouse. Both types still persist, but the shophouse in its traditional form, with a narrow frontage of 20 feet or less, built in terraces without side ventilation to a depth of 60 or 70 feet, is entirely undesirable by modern standards. The recent strong movement, both in official quarters and amongst the Colony's architects, away from the traditional shophouse design is wholly to be welcomed.

149. Latterly, large numbers of more modern forms of buildings, including terrace-houses and flats, have been built. This movement started after the first World War and accelerated greatly after the second World War.

Permanent Housing

150. Past and Present Rates of Building.--The biggest single influence on the provision of modern housing has been, and is, the Singapore Improvement Trust. Between 1930 and the last War, the Trust built 2,103 dwellings and shops, mostly in the form of flats. In 1947, the first year of resumption of building after the War, the Trust completed 224 dwellings and shops. During 1953, annual output had risen to 2,041, so that by the end of 1953, a total of 9,661 dwellings and 451 shops had been built. Vigorous plans for future housing have been made and are being carried out. The Trust's housing efforts are directed towards providing satisfactory permanent homes at as low a cost as possible.

151. Government, the City Council, the Harbour Board and other public authorities are providing homes to meet the considerable needs of their employees.

152.. Private enterprise has made a notable contribution to housing, and lately there has been a tendency to build more for lower income groups particularly on those schemes which have had financial assistance from the Federal and Colonial Building Society. In 1953, private enterprise completed 2,054 permanent dwellings. Nevertheless, it must be noted that there is a lower limit to the cost of satisfactory permanent housing, a limit which puts such housing beyond the means of a large section of Singapore's population.

153. Rates of permanent housing in the years 1948 to 1953 inclusive, are illustrated on Diagram III and indicate a growing appreciation of the housing need. From a total of 1,308 dwellings in 1948, the first post-war year of real activity in the building industry, production has climbed to 4,846 dwellings completed in 1953.

154. Future Needs.--The probable rate of increase of population foreshadowed in Chapter Five indicates that, unless existing rates of house-building are increased greatly, there will be an ever-widening gap between the number of people in the Colony and the number of permanent dwellings in which they can be housed satisfactorily.

155. To assess the number of homes required to be built between 1953 and 1972 to house all the population, it would be desirable to be able to estimate the number of hew households being formed each year. Unfortunately, insufficient data is available to enable a projection to be prepared of the number of new households to be formed each year in the future. According to most recent data, the present average size of households is about 5 persons, and this figure is taken as the basis for future calculations. (The average size of households on Singapore Improvement Trust housing lists is seven, but this figure is attained only because the particular rules of registration employed by the Trust discriminate in favor of larger families.) From Chapter Five, it will be seen that there is likely to be an increase in population between 1953 and 1972 of about 880,000 by natural increase. This figure represents approximately 180,000 households and, if each household is to be provided with a separate dwelling, a residential building programme of about 10,000 homes a year would be required to meet the need.

156. During the next 20 years, an additional and substantial effort must be made to redevelop the obsolete areas of the City. Of the 340,000 people living the City's centre, it is estimated that about half live in dwellings which will have to be rebuilt before 1972. The problems of redevelopment are referred to in more detail in Chapter Twelve.

157. The problems of persons living in temporary, mostly plank-and-attap, dwellings are discussed later in this chapter. The Master Plan proposes the movement of a part of this large population and it can be expected that some of these people will want permanent, rather than temporary, dwellings to live in. It is very difficult to conjecture how many such people there will be and the figure of 20,000 persons used later is, in the broadest sense, an estimate.

158. Finally, consideration must be given to the effect of migration on the housing problem. Present trends indicate that there is very little change in the size of Singapore's population as the net result of immigration and emigration but, as stated in Chapter Five, it is impossible to forecast migratory movement over 20 years. Although the effect of migration on the future housing problem must remain at present an unknown quantity, it may quite possibly prove an additional spur to the building of more homes.

159. From the figures in the foregoing paragraphs, it would appear that 1,050,000 people will require permanent dwellings between 1954 and 1972. On the basis in para. 155 above, this represents 210,000 homes, or a programme of over 11,000 permanent dwellings a year until 1972. It will be appreciated at once that these figures are theoretical. Any attempt to forecast developments on a period of 20 years must proceed on assumptions which the passage of time may alter. For example, the present rate of natural increase may not continue into the future, and substantial migration may take place in or out of Singapore. The Diagnostic Survey Team therefore regard a programme of 11,000 dwellings a year as a theoretical objective to be approached as closely as the resources of the Colony allow.

160. In its report submitted in Reports of Study Groups and Working Parties, the Building Resources Study Group, proceeding on certain necessary assumptions, has assessed the requirements in labour and materials of a residential building programme of 10,000 permanent dwellings a year. Whilst these requirements are formidable, expecially the need to train building labour, they are not impossible to meet, granted firm guidance of the industry. It is doubtful, however, whether requirements much in excess of those figures could be met from the resources of this Colony.

161. A programme of 10,000 homes a year would fall short of the theoretical requirement by approximately 1,000 homes a year, i.e. accommodation for 5,000 persons annually, or about 100,000 persons in all by 1972. But it must be remembered that the figure of 880,000 in para. 155 representing natural increase of population until 1972 is a Colony total and includes the natural increase of all those persons now living in attap dwellings. If the plank-and-attap hut continues to be accepted as a satisfactory form of accommodation then it may well be that a rate of permanent housing of 10,000 dwellings a year would meet the Colony's needs.

162. For the purposes of assessing land requirements in the present Master Plan, the Diagnostic Survey Team has decided to assume that a building programme averaging 10,000 permanent dwellings a year will be achieved in the near future and maintained at least until 1972. The suggested building programme, based on a progressive increase until an adequate figure is reached, is described in Chapter Thirteen on the Realisation of the Plan.

Temporary Housing

163. Temporary housing is almost exclusively in the form of plank-and-attap huts. Within the area shown on the Town Map, the attap survey has shown that some 246,000 people are living in this type of accommodation, and it is possible that a further 150,000 live in attap huts in the rural area, including the Islands.

164. The most densely populated attap areas are near the City at Tiong Bahru, Bukit Ho Swee, Kampong Soopoo and parts of the Kallang Basin. Living conditions in these areas are very bad, and it is considered that they can only be rendered healthy by a planned programme of clearance and rebuilding. In addition, other attap settlements are on land which may be required for permanent housing and other uses, both public and private. It is estimated that it would be necessary to resettle approximately 161,000 attap dwellers at present living within the Town Map Area for one or other of the reasons stated, either to new planned resettlement areas or to permanent housing. The number it is estimated may require permanent dwellings is 20,000 persons. (See papa. 169.)

165. A programme of resettlement has already begun, under Government control, of attap squatters on land required for public projects. Squatters displaced from land required for the new suburbs, Queenstown and Toa Payoh, are being offered the alternative of S.I.T. accommodation or plots of Crown land in areas suitable for attap development. The new settlements will be provided with public utility services, medical services, schools, shops and open space and will offer great attraction to those whose previous homes have been almost completely deficient of comfort.

166. All of the resettlement areas at present proposed are in the rural area, but it is likely that some resettlement may take place in the urban area in localities considered suitable for attap dwellings. At present, some 85,000 persons are living in such areas, but if properly planned, the areas could accommodate 148,000 persons at reasonable densities. It has been noted that certain of these urban kampongs are considered by the Fire Service to be bad risks: this increases the need to provide properly spaced layouts for them.

167. In the rural areas, the majority of attap dwellers are farmers, and the resettlement schemes are being planned with a view to supplementing the food supply of the Colony. This will be done by encouraging some settlers to cultivate small areas of farmland for crops for sale, and others to produce foodstuffs for the settlers' own consumption. (See Chapter Six.)

168. Unlike the problem of constructing permanent homes, that of building plank-and-attap huts is not a question of prodigious outlay in labour, materials and finance. A great deal can be done by self-help, but it is vital that future attap settlement should be carefully planned, and controlled to a degree that will prevent the growth of densely populated slums without adequate utility or community services, and subject also to the risk of fire.

169. The following table summarises the position regarding attap dwellers:--

Urban Planning Area	Number of people
Existing attap population	246,000
Less Attap population displaced	161,000
Attap population on good sites	85,000
Add New planned attap settlements	63,000*
Total future attap population	148,000

* All these persons will require new attap dwellings.

Net displacement from Urban Planning Area: 246,000 - 148,000 = 98,000 people. 20,000 of these people may require permanent houses.

Rural Area	Number of people
Esisting attap population	150,000
Add Attap population displaced from urban area	78,000*
Add Natural increase of attap population	100,000*
Total future attap population	328,000

Summary of Housing Requirements

170. The following table summarises requirements for both permanent and temporary homes between 1954 and 1972:--

Total Housing Liability	Number of people	
Natural increase of population	880,000	
Redevelopment of Central Areas	150,000	
Displacement of attap dwellers	161,000	
To be met from		
Permanent housing		950,000
Urban attap settlements		63,000
Rural attap settlements		178,000
	1,191,000	1,191,100

Residential Density

171. In the Central Area (Redevelopment) existing net residential densities of over 1,000 persons per acre have been found in certain blocks, where people are living on less than 25 square feet of floor. An average gross residential density of 400 persons per acre persists over the whole of the Central Planning Area. In the Urban Planning Area, the existing average gross residential density approximates to 60 persons per acre. In the Rural Planning Area, residential density in some urban development is appreciable but very low elsewhere. Existing densities are illustrated on Maps Nos. 5, 6 and 7. These densities were determined as result of the Land and Building Use Survery described in Chapter Four.

172. Proposed residential densities are described in Chapter Twelve (Quoted later).

Land for Housing

173. It is one thing to determine how many persons require to be accommodated by an analysis of population statistics and social needs; it is quite another thing to find sites on which to build homes. Over a million persons are now crowded on too small an area of land, especially in the Central Planning Area; to secure good living conditions for the present population, the total residential area must increase. To accommodate the future population, the residential area must increase much further. These increases in area must be so made that planning problems will be solved, and new ones not created. The Juxtaposition of industry, commerce, communications and housing has had to be most carefully studied. The areas zoned for residential use in the Master Plan offer a solution to all these problems and provide land on which a programme of 10,000 permanent dwellings a year and an adequate number of temporary dwellings could be carried out a reasonable densities.

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* All these persons will require new attap dwellings.

174. The following table summarises the proposed changes in distribution of population:--

1953

Central Planning Area		
Population satisfactorily housed	190,900	
Population affected by redevelopment	150,000	
		340,900
Urban Planning Area		
Population satisfactorily housed in permanent dwellings	306,700	
Attap population affected by rehousing	161,000	
Attap population not affected by rehousing	85,000	
		552,700
Rural Planning Area		
Attap population	150,000	
Population in permanent homes	70,000	
		220,500
Population not specifically allocated to particular areas		6,700
		1,120,800
Central Planning Area		
Population in permanent homes		290,000
Urban Planning Area		
Population in permanent homes	852,400	
Population in attap settlement	148,000	
		1,000,400
Rural Planning Area		
Population in permanent homes		
New towns: Woodlands	80,000	
Bulim	85,000	
Yio Chu Kang	35,000	
Elsewhere	120,500	
Population in attap settlement		668,000
		1,958,400

Conclusion

175. The above comprises a statistical review of the housing problem of Singapore summarised in Diagram III. In considering these figures however, it must never be forgotten that they represent the people of this Colony whose happiness every day depends very largely on the homes they live in. The problems is not to build four walls and a roof for all the thousands who need them but to build sufficient homes of good design in places where people will wish to live, where water, gas and electricity can be brought to them, the land drained, the buildings sewered, the roads built, the schools, hospitals and cinemas provided and the whole completed within the resources of the Colony."

Central Area—A considerable amount of property is at or beyond the end of its useful life, dilapidated and insanitary (*para* 70)

Central Area—The average sizes and shapes of lots in individual ownerships are such that adequate development at modern standards is difficult (*para* 70)

Community centers and health centers and playing fields are being planned for. They are an entirely new feature in Singapore.

The open space and playing fields reservations are intended to serve two functions in the urban built-up area, namely the purpose of recreation, and that of ventilation of the built-up area. The report goes into detail concerning the seven types of open spaces proposed: incidental open spaces; district open spaces (serving particular locality); town open spaces, including playing fields, serving urban population; school playing fields; green belt and nature reserves; cemeteries; beaches.

The provision of water, gas and electricity is the function of the City Council. The supply of water and electricity is Island-wide, but the gas network does not at present extend beyond the City limits. Sewerage and land drainage are also functions of the City Council within the City limits, and at present only a few smaller centers of population outside the City are sewered.

The section entitled "Distribution of Population" follows verbatim:

Chapter 12

"317. Distribution of Population.-- The population of the Colony is at present unevenly distributed, for about one-third of its people live in the Central Planning Area. Although densities will always be high in the heart of the City, in the Plan it is proposed that some redistribution should take place to places elsewhere in the Colony in order to alleviate conditions in the centre. It is considered that if about one-sixth of the present number leave, conditions could be improved immeasurably for those who remain. To accommodate the persons who leave, and also the large natural increase--or the persons displaced by that increase, since it consists in the first instance of children--the Plan proposes the construction of new settlements of the following kinds:--

(a) new suburbs related to the parent City, of which Queenstown is a good example, comprising planned residential areas with adequate schools, open space, etc., and a measure of industrial and business use;

(b) new towns, planned for self-sufficiency, having a corporate life of their own, and largely independent of the City, with places of work and community services adequate for the majority of their population;

(c) expanded villages, of which the nuclei already exist, to be developed to serve as centres of rural life. The prime need of these centres is community services on an adequate scale;

(d) agricultural settlements on land little used at present, to accommodate farmers and market gardeners displaced from areas required for other development. These settlements would contribute to the maintenance of the supply of local agricultural produce.

318. Details of the proposed redistribution of population are contained in the Written Statement, but the following table provides a general picture of the changes proposed:--

Planning Area	1953		1972	
	Population	% Total Population	Population	% Total Population
Central	340,900	30.4	279,200	14.3
Urban	552,700	49.3	1,000,400	51.4
Rural (inc. Islands)	220,500	19.7	668,000	34.3
Unlocated	6,700	0.6	---	---
TOTALS	1,120,800	100.0	1,947,600	100.0

Vol III
Master Plan: Reports of Study Groups and Working Parties. This volume contains detailed reports of the following study groups: Redevelopment Working Party; Population Study Group; Industrial Resources Study Group; Building Resources Study Group; Traffic Standards Study Group. Of these, the report of the Building section is of major interest re housing.

The Building industry in the Colony is a free enterprise and has many facets. It is not easy to obtain accurate information. Summaries of information gathered are presented in text and tabular form. Following are a few digests and some reproduction of selections from this data. On the basis of answers to questionnaires, there is no shortage of "unclassified" labor but an indication of a shortage of highly skilled labor in the trades of "mason, carpenter and joiner." This shortage was at rates of building prevailing in 1952 when there was full employment in the industry, and the shortage at that time had been prevalent for some time. Investigation relative to cost of labor and materials on specific contracts shows labor costs account for between 25 and 30% of the total cost (including profit). The corresponding figure in the United States is 50%, and although experience differs in the United Kingdom there is no doubt that the figure there is appreciably higher than in Singapore.

Cement

35. All Singapore's cement is imported coming in large quantities from the United Kingdom and Japan, and from other sources. The production of cement in the Federation is now under way, but presumably the needs of the Federation will be met first.

36. In regard to cement it must be noted that long storage in Singapore's humid climate leads to deterioration and, unless storage conditions are excellent, the maximum storage period should not exceed 3 months. It is therefore impossible to maintain a large reserve of cement for any length of time.

37. The quantity of cement generally is up to the appropriate British Standard Specifications, although supplies require testing, and there is every indication that requests for additional supplies, even of large quantities, could be met.

Concrete Blocks

38. In recent years, the use in the Colony of concrete hollow blocks for building has increased enormously. Rated in brick units, concrete blocks are, at present prices, regarded as a more economic form of construction than bricks themselves and are extensively used on low-cost housing schemes. The blocks are manufactured locally in imported machines from imported cement and other local materials. The increased use of blocks has encouraged the purchase of more machines and the productive capacity of the Colony is now rated as 33 million brick units a year, as against 11 million in mid-1952. An increase on the present capacity should not be difficult to achieve.

39. In the experience of the Singapore Improvement Trust, the blocks are suitable for the erection of load-bearing structures up to 3 storeys and for use in panel and frame walling in reinforced concrete buildings of all types.

Bricks

40. With a very large supply of clay, the Colony has long been able to supply its own need of bricks, and to export up to 4 millions a year. With few exceptions, the bricks are up to the appropriate British Standard Specifications and suitable for all general purposes.

41. Competition from the concrete block industry is causing concern to brick companies who now carry large stocks of bricks. It is possible that the erection of new brick-works using more modern methods of production will allow bricks to be sold at prices more competitive to concrete blocks, but at present there is a danger of overproduction in the brick industry. Any considerable increase in building would, of course, relieve the position and it would be poor policy indeed to allow the brick industry to fail. With the supply of cement relying

entirely on imports, the brick industry is the only local source of the staple building material. Measures which the industry might consider are the manufacture of facing bricks to fulfil a real need to reduce the cost of maintenance of buildings, and of clay blocks to compete with concrete blocks. Since a prime reason of preference for concrete blocks, each consisting of multiple brick units, is the saving they allow in brick-laying labour, consideration might also be given to the manufacture of larger brick units or panels.

Roofing Tiles

42. Although the use of flat roofs increases, there is still a demand for pitched, tiled roofs in Singapore because of their insulating qualities. The demand for cement tiles is satisfied from local sources, and for clay tiles mostly from India, and there is no doubt that increased requirements could be met.

Steel Reinforcement

43. All Singapore's steel is imported, predominantly from Continental Europe. In the post-war years there has been difficulty in obtaining enough steel to fulfil Singapore's building requirements, but the position eased in 1952, at the rates of building then prevailing. There were ample supplies of steel available in 1953 but we consider that an increased building programme, especially of high buildings, might well lead to a return of previous difficulties.

Timber

44. Singapore's timber supplies come from the Federation and Indonesia. Some is imported already sawn, and a large amount is sawn locally. Some Singapore sawmills, of which there are 18 major mills and 7 minor ones, were working short-time in 1952 and the figure of 170,000 tons of timber sawn in that year does not represent the full productive capacity of the mills. Only a small proportion of this timber was used in major buildings houses and for shuttering, etc.; there is also a large overseas export trade in sawn timber from Singapore.

Chapter Six

Conclusions and Recommendations

76. It appears to be generally accepted that rates of building, particularly residential building, should increase substantially in Singapore. The degree to which such rates can increase is limited by the availability of land, finance, labour and materials. The Master Plan now being prepared will indicate where development should take place and will assess the consequent building requirements of the Colony. In approving the Master Plan, Government will no doubt have regard to the financial implications of the phasing of the different stages of development proposed in the Plan. On approval of the Master Plan there will therefore be available an authoritative statement in general terms of the Colony's building requirements over a specified period. The data in this report has been presented in such a way that the resources in building labour and materials needed to meet those requirements can readily be assessed.

77. The Study Group consider that these requirements are likely to be so extensive that the chances of their being met efficiently within the specified period are, if not remote, then considerably reduced unless a firm co-ordinated building programme, coupled to a scheme ensuring an adequate supply of building labour and materials, is adopted on approval of the Master Plan. It is considered that such a building programme should extend over the widest possible range of development and should certainly include the projects of all public authorities.

78. In considering the practicability of this proposal, it seems to the Study Group that the co-ordination of such a programme might be undertaken by a Government-sponsored authority having full knowledge of the public bodies concerned and of all the factors involved, i.e. land, finance, labour and materials. With any necessary alteration in its constitution, the Planning Co-ordination Committee, whose function is to co-ordinate the land requirements of public authorities, might well undertake this task. Before approval by Government,

building programmes of the various departments might be referred to the co-ordinating authority for consideration in the light of available resources and Master Plan proposals, and Government's consideration would take into account any views of the co-ordinating authority. Such views would relate to the relative priorities of development projects, the availability of resources to meet demands, and the need to increase supplies of particular resources. Such an authority might also bear in mind the possibility of acceleration of rates of building in time of unemployment in other types of work.

79. The Study Group appreciate that the programmes of public authorities are governed by financial allocations and that the statistics in this report are not related to cost. In para. 53 it is explained that cost has been avoided as a datum because it is subject to variation as instanced by Appendix E. The statistics are, however, capable of being related to cost on a sliding scale.

80. The Study Group further appreciate that substantial adjustment of the supply of resources is not practicable in the short period, e.g. the training of classified building labour to a proper standard takes not less than three years. The Group therefore consider that any building programme prepared should have a dual aspect--long-term (five years or more) and annual; the long-term programme to be prepared in terms sufficient for a broad assessment of resources required, and the annual programmes in relation to immediate priorities and to resources immediately available from year to year.

81. The Study Group do not consider that private building could be included in a firm building programme, although appropriate allowances would need be made for the resources it may use. Further, because their development is controlled remotely, it does not appear possible for H.M. Forces' development to be included in such a programme.

82. The Study Group therefore recommend that, on approval of the Master Plan, a firm building programme for all public services be adopted, such programme having both general long-term and detailed short-term aspects, and that an authority be empowered to co-ordinate the continuing execution and amendment of the programme in terms of the priority of development projects and the availability of land, labour materials and finance.

Building Labour

83. At rates of building prevailing in late 1952, a time of full employment in the building industry, there was no appreciable shortage of 'classified' labour but, if rates of building were substantially increased, the Study Group consider that an acute shortage of labour would arise in all main building trades. It is not considered that any shortage of 'unclassified' labour would be experienced.

84. Without the adoption of a firm co-ordinated programme, no indication can be given of the extent of the liability to train building labour. The existing methods of training are discussed in para. 24, and are patently unrelated to Colony building requirements.

85. The Study Group therefore recommend that, as an indispensable corollary to any substantially increased building programme adopted, means of training more classified building workers must be found. The Group consider the following measures worthy of consideration:--

(a) The encouragement of the establishment of apprenticeship schemes under central control throughout the building industry. One method of achieving this object might be the grant of certificates of trade competency and, after an agreed period, the limitation of public services' contract work to holders of such certificates in appropriate trades.

(b) The expansion of existing Trade School training and the possible inclusion in the scope of the proposed Polytechnic of courses in practical building construction. Provision should be made for the training of adults in addition to young recruits.

(c) The grant of wide publicity to any increased building programme adopted, and especially to guarantees of intention to carry it out, which would give encouragement to the industry to participate in training schemes.

86. The Study Group are aware of past proposals for the importation of skilled building labour. The need for large-scale building operations in Singapore seems likely to continue for many years as the population increases, and the Study Group consider that dependence on outside sources for the required labour is an unsatisfactory policy, creating as many problems as it solves, e.g. provision of accommodation, security screening, distribution of labour. The Study Group therefore recommend that every effort should be made to meet the Colony's requirements in building labour from Singapore's own people, whose potential as craftsmen is not less than that of other peoples.

Building Materials

87. Whilst the group find that there was no significant shortage of basic building materials at the rates of building prevailing in 1952, and have observed continued adequate supply during 1953, they consider that a substantially increased building programme would cause a chortage, primarily in steel, but later of other basic materials, especially those imported, unless prior arrangements for increasing supplies were made. The Study Group therefore recommend that, if an increased programme is adopted and their recommendations set out above are agreed, a continuing tally should be kept of materials required and available and a report be made at frequent intervals to the co-ordinating body referred to in paras. 75 and 79, so that action could be taken, through the agencies of Government or otherwise, to supplement supplies to meet impending requirements. Members of the Group have expressed willingness to serve on, or contribute their experience to, any froup formed to keep stock of building resources. They are of the opinion that the continuance of a body such as the Building Resources Study Group during the period of the realisation of the Master Plan would be an advantage.

88. The Group are conscious of the great extent to which building in Singapore relies on imported materials, and they feel that any measures to encourage local industries to manufacture building materials would be for the benefit of the Colony. A note to that effect has been sent to the Industrial Resources Study Group.

Building Economy

89. Paras. 68 to 72 express the views of the Group on Building economy, and they consider that Singapore has much to gain from the practice of modern building methods. Some forms of local development are notably prodigal in the use of limited resources and the whole industry--client or public authority, architect, contractor and building worker--could derive immediate benefit from the use of mechanical aids (power tools) and alternative materials (lower grade impregnated timbers), the standardisation of sizes, economy in specifications, and factory production of components.

90. The Study Group are aware that efforts towards building economy have been made and that local research on building materials has taken place, but consider that the value of these isolated efforts has been reduced because of the lack of any central organisation to disseminate the information so gained. Proposals for the establishment in Singapore of a Building Research Station to serve not only the Colony but all South-East Asia have been under consideration for some considerable time. Such a station would carry out much needed experiments on the behaviour and use of building materials in equatorial and tropical regions, investigate methods of construction and design the possibilities of specialisation and mechanisation, and the relationship between houses and the needs of their inhabitants. The Station would give advice and collate and issue relevant information from similar stations elsewhere in the world. The Group consider that the establishment of such a station is a matter of very considerable importance and that even if, initially, it were only in the nature of a Technical Information Service, this would be of real benefit to the building industry and the general public. The Study Group therefore recommend that urgent consideration should be given to the establishment in the Colony of a Building Research Station as described above.

91. In concluding its report, the Group draws attention to the following matters:--

(a) That its membership represents all the principal building interests in the Colony of Singapore.
(b) That this report is an expression of fact and the unanimous opinion of its members.
(c) That this report is the outcome of almost two years' intensive study of the Colony's building industry.

The Group considers that the adoption of its conclusions and recommendations can result in real benefit to the building industry and the people of Singapore.

D. H. Komlosy,
Representing the Diagnostic Survey Team.

Chew Peng Yam,
Representing the Chinese Contractor's Association

Gattey & Bateman,
p.p. The Master Contractors' Association

Wong Foo Nam,
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A. Distin,
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J. J. Lougheed, Mjr.,
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J. Paisley, S/Ldr.,
Representing the Royal Air Force

K. A. Brundle,
Representing the Public Works Department

F. G. Tyson,
Representing the Labour Department

S. C. Woolmer,
Representing the Singapore Improvement Trust

S. J. Askew (Secretary).

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82. The Study Group therefore recommend that, on approval of the Master Plan, a firm building programme for all public services be adopted, such programme having both general long-term and detailed short-term aspects, and that an authority be empowered to co-ordinate the continuing execution and amendment of the programme in terms of the priority of development projects and the availability of land, labour materials and finance.

Building Labour

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84. Without the adoption of a firm co-ordinated programme, no indication can be given of the extent of the liability to train building labour. The existing methods of training are discussed in para. 24, and are patently unrelated to Colony building requirements.

85. The Study Group therefore recommend that, as an indispensable corollary to any substantially increased building programme adopted, means of training more classified building workers must be found. The Group consider the following measures worthy of consideration:--

(a) The encouragement of the establishment of apprenticeship schemes under central control throughout the building industry. One method of achieving this object might be the grant of certificates of trade competency and, after an agreed period, the limitation of public services' contract work to holders of such certificates in appropriate trades.

(b) The expansion of existing Trade School training and the possible inclusion in the scope of the proposed Polytechnic of courses in practical building construction. Provision should be made for the training of adults in addition to young recruits.

(c) The grant of wide publicity to any increased building programme adopted, and especially to guarantees of intention to carry it out, which would give encouragement to the industry to participate in training schemes.

86. The Study Group are aware of past proposals for the importation of skilled building labour. The need for large-scale building operations in Singapore seems likely to continue for many years as the population increases, and the Study Group consider that dependence on outside sources for the required labour is an unsatisfactory policy, creating as many problems as it solves, e.g. provision of accommodation, security screening, distribution of labour. The Study Group therefore recommend that every effort should be made to meet the Colony's requirements in building labour from Singapore's own people, whose potential as craftsmen is not less than that of other peoples.

Building Materials

87. Whilst the group find that there was no significant shortage of basic building materials at the rates of building prevailing in 1952, and have observed continued adequate supply during 1953, they consider that a substantially increased building programme would cause a chortage, primarily in steel, but later of other basic materials, especially those imported, unless prior arrangements for increasing supplies were made. The Study Group therefore recommend that, if an increased programme is adopted and their recommendations set out above are agreed, a continuing tally should be kept of materials required and available and a report be made at frequent intervals to the co-ordinating body referred to in paras. 75 and 79, so that action could be taken, through the agencies of Government or otherwise, to supplement supplies to meet impending requirements. Members of the Group have expressed willingness to serve on, or contribute their experience to, any froup formed to keep stock of building resources. They are of the opinion that the continuance of a body such as the Building Resources Study Group during the period of the realisation of the Master Plan would be an advantage.

88. The Group are conscious of the great extent to which building in Singapore relies on imported materials, and they feel that any measures to encourage local industries to manufacture building materials would be for the benefit of the Colony. A note to that effect has been sent to the Industrial Resources Study Group.

Building Economy

89. Paras. 68 to 72 express the views of the Group on Building economy, and they consider that Singapore has much to gain from the practice of modern building methods. Some forms of local development are notably prodigal in the use of limited resources and the whole industry--client or public authority, architect, contractor and building worker--could derive immediate benefit from the use of mechanical aids (power tools) and alternative materials (lower grade impregnated timbers), the standardisation of sizes, economy in specifications, and factory production of components.

90. The Study Group are aware that efforts towards building economy have been made and that local research on building materials has taken place, but consider that the value of these isolated efforts has been reduced because of the lack of any central organisation to disseminate the information so gained. Proposals for the establishment in Singapore of a Building Research Station to serve not only the Colony but all South-East Asia have been under consideration for some considerable time. Such a station would carry out much needed experiments on the behaviour and use of building materials in equatorial and tropical regions, investigate methods of construction and design the possibilities of specialisation and mechanisation, and the relationship between houses and the needs of their inhabitants. The Station would give advice and collate and issue relevant information from similar stations elsewhere in the world. The Group consider that the establishment of such a station is a matter of very considerable importance and that even if, initially, it were only in the nature of a Technical Information Service, this would be of real benefit to the building industry and the general public. The Study Group therefore recommend that urgent consideration should be given to the establishment in the Colony of a Building Research Station as described above.

91. In concluding its report, the Group draws attention to the following matters:--

(a) That its membership represents all the principal building interests in the Colony of Singapore.
(b) That this report is an expression of fact and the unanimous opinion of its members.
(c) That this report is the outcome of almost two years' intensive study of the Colony's building industry.

The Group considers that the adoption of its conclusions and recommendations can result in real benefit to the building industry and the people of Singapore.

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